Prediabetes: a focus on the role of diabetes education in prevention of type 2 diabetes

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Introduction

Awareness of the seriousness and magnitude of the diabetes epidemic has heightened, resulting in increasing emphasis being placed on prevention. In the last decade, several major institutions have developed guidelines for prevention measures. The World Health Organization (WHO) developed the Action Plan on Prevention and Control of Non-Communicable Diseases in 2008,[1] and a global strategy on Diet, Physical Activity and Health (DPAS) in 2004.[2] These provide a framework within which governments can develop policies that promote healthy eating and increased physical activity.

The International Diabetes Federation (IDF) produced a consensus paper in 2007[3] which challenged governments in both the developed and the developing world to create national diabetes prevention plans. These plans should aim to identify those at high risk of diabetes, and should recommend strategies using lifestyle and environmental changes to prevent progression of the condition.[3]

Sixty per cent of all deaths worldwide are attributed to non-communicable diseases such as diabetes, heart disease and cancer.[1] Unhealthy lifestyles such as poor diet, lack of physical activity and obesity are considered to be the main causative factors in these conditions.

Diagnosis

Prediabetes is a term used to describe the states of impaired fasting glucose (IFG) and/or impaired glucose tolerance (IGT). Prediabetes is indicated by higher-than-normal blood glucose levels which suggest a high risk for progression to diabetes mellitus. Trends from the Diabetes Prevention Programme showed that 11% of the control study group developed diabetes, while only four per cent in the prevention programme with lifestyle changes developed diabetes during the follow-up period.[4]

Other results from this study are that the prediabetes condition increases the risk of cardiovascular disease 1.5-fold and diabetes increases the risk two- to four-fold, making the importance of prevention through lifestyle changes imperative.[4]

Diagnostic criteria (World Health Organization/International Diabetes Federation, 2006)

	Fasting plasma glucose (mmol/L)	Two hours [a]OGTT plasma glucose (mmol/L) (75g glucose load)
Diabetes	≥ 7.0	≥ 11.0
Normal	< 6.1	< 7.8
[b]IFG/[c]IGT	6.1-6.9	≥ 7.8- < 11.0
Gestational	≥ 6.1	> 9.0 (100 g load)

[a] = oral glucose tolerance test
[b] = impaired fasting glucose
[c] = impaired glucose tolerance

Research

Numerous studies have shown the importance of lifestyle changes in the prevention of type 2 diabetes, including weight reduction and exercise programmes.

The Diabetes Prevention Programme Outcomes study[4] showed that intensive lifestyle modification was able to reduce the progression to type 2 diabetes by over 50%, and by over 30% with the use of metformin (850 mg twice daily), in less than three years. In the 10-year follow-up, where the participants had been offered continued lifestyle support, it was shown that those on continued lifestyle support only had regained some of the weight loss, but the participants taking metformin had maintained their weight loss. It also showed that the incidence of diabetes was reduced by 34% in the lifestyle group and 18% in the metformin group, showing that lifestyle intervention and metformin treatment could inhibit the progress to type 2 diabetes for at least 10 years.[4]

In the Diabetes Prevention Program[5] (DPP), and other large studies, it has been shown that people with prediabetes can often prevent or delay diabetes if they lose a modest amount of weight by cutting fat and calorie intake and increasing physical activity by, for example, walking 30 minutes a day for five days a week. Losing just five to seven per cent of body weight prevents or delays diabetes by nearly 60%.

In the DPP, people aged 60 or older, who made lifestyle changes, lowered their chances of developing diabetes by 70%. Many participants in the lifestyle intervention group

returned to normal blood glucose levels and lowered their risk of developing heart disease and other problems associated with diabetes.[5]

A recent paper by the research group of the 10-year follow-up[6] showed that the weight loss was sustained by the increase in physical activity, and even those who had not lost weight had reduced their risk with an increase in physical activity. It also showed an improvement in lipid levels and hypertension.[6]

The Finnish Diabetes Prevention Study[7] specifically examined the effect of lifestyle intervention on overweight/obese subjects with IGT and showed a reduction by half in type 2 incidence. Recent indications are that the reduction in incidence was maintained for at least four years.[8]

The Malmö Study[9] concluded that those men who had participated in the lifestyle intervention groups had comparable mortality rates to normoglycaemic men, and less than half the mortality rate of men with IGT receiving usual care.

The Da Qing Study[10] showed that diet intervention was associated with a 31% reduction in progress to diabetes mellitus, while the exercise intervention showed a 46% reduction. However, a combination of both diet and exercise resulted in a 42% reduction.

Numerous other studies reinforce these findings.[11-17]

Education on lifestyle modification

Recognition of the importance of lifestyle intervention necessitates the need for education on the prevention and management of diabetes. This role is best filled by a diabetes educator. His/her task is to assist those with IGT and IFG, to learn the skills needed to live a healthy life. These skills will enable patients to take charge of their health through responsible self-care, an increase in knowledge, diabetes skills training, changes in attitude and motivation, and adherence and improved care.

There have been calls for massive education programmes on the prevention of cardiovascular disease, how to ensure individual responsibility for health, and implementation of population-wide lifestyle modifications to ensure cardiovascular health.[14]

In the Finnish study,[7] the subjects were provided with individual counselling. The focus was on increased physical activity, adopting a healthy eating plan (which included increased dietary fibre intake and reduced total and saturated fat intake), and achieving and maintaining healthy body weight.

The DPP[5] study showed that diet and exercise were more effective in delaying diabetes onset than medication. Those who sustained a five to ten per cent weight loss and maintained 30 minutes per day of moderate activity, such as walking, could expect a 58% reduction in progression to diabetes over three years, across ethnic groups and in both men and women.[5]

A practical suggestion for regular exercise (building up to 10 000 steps a day) has been shown to assist with weight loss and increased insulin sensitivity.[18] Those who managed and maintained the programme showed a threefold improvement after five years. When compared with 30 minutes of continuous physical activity, or 30 minutes of activity in bouts of at least 10 minutes, the 10 000 step programme proved the most effective, and the largest increase in step counts resulted in most minutes of moderate to vigorous activity as fitness improved.[18]

Summary

This evidence reinforces the view that the time has come for a concerted effort to prevent diabetes and for governments to support the calls of the IDF, the WHO and the United Nations to initiate and maintain programmes for the education of high risk groups and the general population. These programmes must aim to change trends, enabling people to become healthier individuals with improved lifestyles that include well-balanced diets and increased participation in physical activities.

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